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Pile Retaining Walls

Application

Basement construction, road/rail cuttings, underpasses, cut-and-cover tunnels and portals, cofferdams, underground tanks, slope stabilisation.

Systems available include secant and contiguous pile walls. King post walls can also be offered. The choice of system depends on a variety of factors including soil type, groundwater, retained height, deflections, propping arrangement, design life, etc.

Advantages

- Maximum underground space; with minimum bulk excavation
- Adaptable to complex wall layouts
- Control of ground movements and groundwater
- Wide range of wall thicknesses and capability
- Can be installed in restricted working space.
- Can be designed to carry long term vertical loads
- Cost and time saving plus health and safety benefits when combined with patented Cementation precast guide/capping beam.



Large and small diameter bored cast-in-place piles are often used to construct efficient and economic temporary or permanent retaining walls. These walls are suitable for deep basements, underpasses, tunnel portals and other underground structures particularly where working space is limited and adjacent structures require support. They minimise bulk excavation and help to control ground movements and groundwater ingress.

Three distinct bored pile wall systems are in current use:

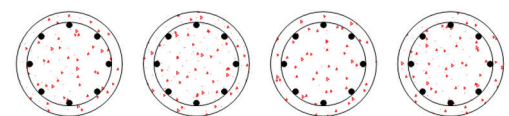
- Contiguous pile wall
- Secant pile wall – hard/soft or hard/firm
- Secant pile wall – hard/hard

The choice of system depends on a number of factors. These include soil type, ground water profile, retained heights, available construction time, propping arrangement, cost and design life. Piles can be constructed using cased rotary or continuous flight auger (CFA) methods. Where working space is limited, minipiling techniques

may be appropriate. Pile diameters up to 1200mm are commonly used. Larger diameters can be installed with rotary piling equipment. Maximum pile depths of 29m are possible with CFA Greater depths generally require rotary piling.

Bored pile walls can be combined with our patented precast guide wall/capping beam system to secure health and safety, cost, and programme benefits.

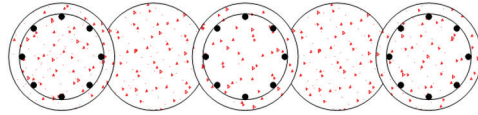
Contiguous Pile Wall



Contiguous piles are suitable where the groundwater table is below excavation level. It is normally the most economic and rapid option. The wall consists of discrete piles typically installed at centres 150mm greater than their diameter, leaving gaps where soil is exposed during excavation.

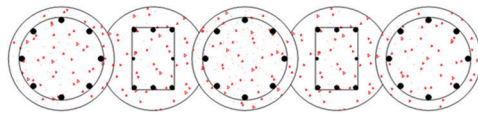
Permanent works applications therefore generally require an additional reinforced concrete lining to secure exposed soil, and resist long term groundwater pressures.

Secant Pile Wall – Hard/Soft or Hard/Firm



Where short term water retention is required this system offers the most cost-effective and rapid solution. The wall consists of interlocking bored piles. Primary piles are constructed first using a 'soft' cement-bentonite mix (commonly 1N/mm²) or 'firm' concrete (commonly 10N/mm²). Secondary piles, formed in structural reinforced concrete, are then installed between the primary piles with a typical interlock of 150mm. These walls may need a reinforced concrete lining for permanent works applications, depending on the particular requirements of the project.

Secant Wall – Hard/Hard



Hard/hard wall construction is very similar to a hard/firm wall but in this case the primary piles are constructed in higher strength concrete and may be reinforced. Heavy duty rotary piling rigs, using tools fitted with specially designed cutting heads, are necessary to cut the secondary piles. Since structural concrete is used throughout there may be no need to provide a lining wall. The end product provides a fully concreted face and can be an effective alternative to diaphragm wall construction.



Design

Cementation Skanska provide a full design and construction service engineered by a highly experienced in-house design department. We can also operate on a build-only basis to the Client's specification. Our expertise enables us to offer early contractor involvement, helping our clients to develop and assess a range of practical and economic solutions.